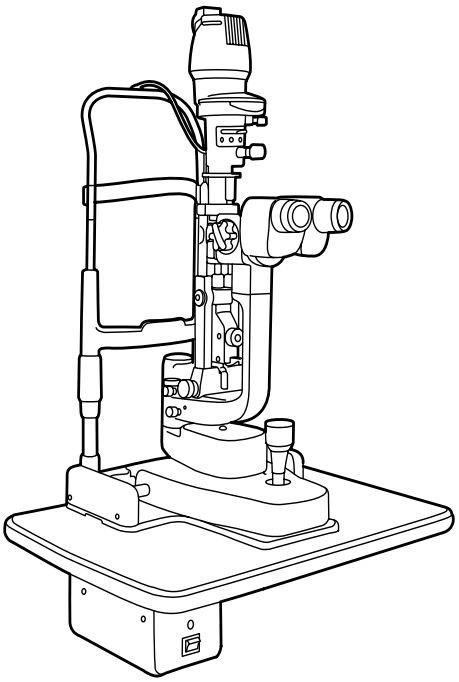
TOPCON



INSTRUCTION MANUAL
SLIT LAMP

SL-D7
SL-D8Z

INTRODUCTION

Thank you for purchasing the Slit Lamp SL-D7, SL-D8Z.

This slit lamp is used for the enlargement observation of eyeballs and the parts.
This instrument has the following features:

- Various accessories to extend the system
- Ergonomic cable layout
- Clear fluorescent cornea observation and photography of cornea
- Clear eyeground observation and photography by color conversion filter

---

This Instruction Manual covers an overview of the basic operation, troubleshooting, checking, maintenance and cleaning of the Slit Lamp SL-D7, SL-D8Z.

To get the best usage from the instrument, please read “Displays for Safe Use” and “Safety Cautions”.
Keep this Instruction Manual with the instrument for future reference.

PRECAUTIONS

WORKING ENVIRONMENT

Temperature:	10°C-40°C
Humidity:	30-75% (no dewing)
Atmospheric Pressure:	700hPa-1,060hPa

STORAGE METHOD

1. Environmental Conditions

Temperature:	10°C-40°C
Humidity:	30-75% (no dewing)
Atmospheric Pressure:	700hPa-1,060hPa

2. Place of Storage
   (1) Protected from water splashes
   (2) Protected from adverse effects caused by atmospheric pressure, temperature, moisture, ventilation, sunlight, dust, salt content, sulfur, etc.
   (3) Stable, without slopes, and protected from vibrations, shocks (including transportation), etc.
   (4) Free of chemicals and gases

PREMISSIBLE ENVIRONMENTAL CONDITIONS FOR TRANSPORT AND STORAGE

Temperature: -20°C - 50°C
Humidity : 10 - 95%

MAINTENANCE AND CHECKS

1. Regularly maintain and check equipment and parts.
2. When using equipment for the first time in a while, check in advance that everything is operating as it should.
3. Keep the objective lens free of fingerprints and dust.
4. When not is use, protect the instrument with the dust cover.
5. If the objective lens is stained, clean it in accordance with the information under “Cleaning Lenses and Mirrors” in the Instruction Manual.

DISPLAYS FOR SAFE USE

In order to ensure the safe use of the product and to prevent danger to the operator and others, or damage to property, important warnings are placed on the product and inserted in the instruction manual.
It is recommended for all users to take note of the meaning of the following displays and icons before reading the "Safety Cautions" and text.

DISPLAYS

DISPLAY	MEANING
WARNING	Ignoring or disregarding this notice could lead to death or serious injury.
CAUTION	Ignoring or disregarding this display may lead to personal injury or physical damage.

- Injury refers to cuts, bruises, sprains, fractures, burns, electric shocks, etc.
- Physical damage refers to damage to buildings, equipment or furniture.

ICONS

ICONS	MEANING
	This indicates Prohibition. Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.
	This indicates Mandatory Action. Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.
	This icon indicates Hazard Alerting (Warning). Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.

SAFETY CAUTIONS

CAUTION

Icons	Prevention item	Page
	To prevent falling during use and movement, secure each unit.	**15**
	To avoid injury to the eye and nose whilst moving the base unit, make sure that you have a clear view of the slit lamp and the patient's face.	**29**
	For the safety of the operator and the patient, do not place fingers between moving parts.	**29**
	To avoid injury to the patient’s head, incline the illumination unit holding the base unit.	**30**
	To avoid causing discomfort to the patient or any damage to the patient's eye, keep the illumination at its minimum during adjustment.	**30**
	To avoid electric shocks, do not attempt overhauling, rebuilding or repairs. Ask your dealer for repair.	**36**
	When replacing the lamp, switch off the power supply and remove the power cable to avoid electric shocks.	**44**
	Beware of high temperatures when replacing the lamp immediately after switching it off: these could cause burns.	**44**
	When replacing fuses, first switch off the power supply and remove the power cable to avoid electric shocks.	**46**
	Before carrying out daily care, remove the power cable (to avoid electric shocks) and wait until the lamp house has cooled (to avoid burns).	**47**
	Do not touch parts inside the lamp house cover during operation and immediately after switching off the power supply: this could cause burns.	**47**
	The base contains strong springs. Do not attempt to disassemble or burn the base, as the springs could cause injury by shooting out of it.	**48**
	To prevent falling during use and movement, secure optional accessories.	**49**

⚠ CAUTION

Icons	Prevention item	Page
⚠	This instrument has been tested (with 120V/230V) and found to comply with IEC60601-1-2: 2001. This instrument radiates radio frequency energy within standard and may affect other devices in vicinity. If you have discovered that turning on/off the instrument affects other devices, we recommend you change its position, keep a proper distance from other devices, or to change the outlet. Please consult the dealer from whom you purchased the equipment for any questions.	––

MAINTENANCE

USER MAINTENANCE

To maintain the safety and performance of the instrument, unless done by an authorized service engineer, never attempt to do maintenance of items other than those specified here in. For details about maintenance, read the description of this manual.

REPLACING THE ILLUMINATION LAMP

The illumination lamp can be replaced if necessary. For specific instructions, see page 44.

REPLACING THE FIXATION TARGET BULB (FOR BULB TYPE FIXATION TARGET ONLY)

The fixation target bulb can be replaced if necessary, see page 45.

REPLACING THE FUSE

Fuses on the primary side can be replaced, if necessary. For specific instructions, see page 46.

ESCAPE CLAUSE

- TOPCON shall take no responsibility for damage due to fire, earthquakes, actions by a third party or other accidents, or the negligence and misuse of the user and use under unusual conditions.
- TOPCON shall take no responsibility for damage derived from the inability to use this equipment, such as a loss of business profit and suspension of business.
- TOPCON shall take no responsibility for damage caused by operations other than those described in this Instruction Manual.
- Diagnoses made are the responsibility of qualified doctors and TOPCON shall take no responsibility for the results of such diagnoses.

WARNING INDICATIONS AND POSITIONS

To ensure safety, warning labels are provided on the instrument body.
Use the instrument following these warning instructions. If any of the following labels are missing, contact your dealer or TOPCON (see the back cover).

CAUTION

- To prevent electric shocks, switch off the power supply and remove the power cable before replacing the lamp.
  Afin d'éviter tout choc électrique, coupez le contact et débranchez le câble d'alimentation avant de remplacer l'ampoule.
- Do not replace the lamp immediately after switching it off: the high temperatures could cause burns.
  Afin d'éviter toute brûlure, prenez garde à la température élevée de l'ampoule lorsque le remplacement de celle-ci se fait immédiatement après avoir coupé l'alimentation électrique.

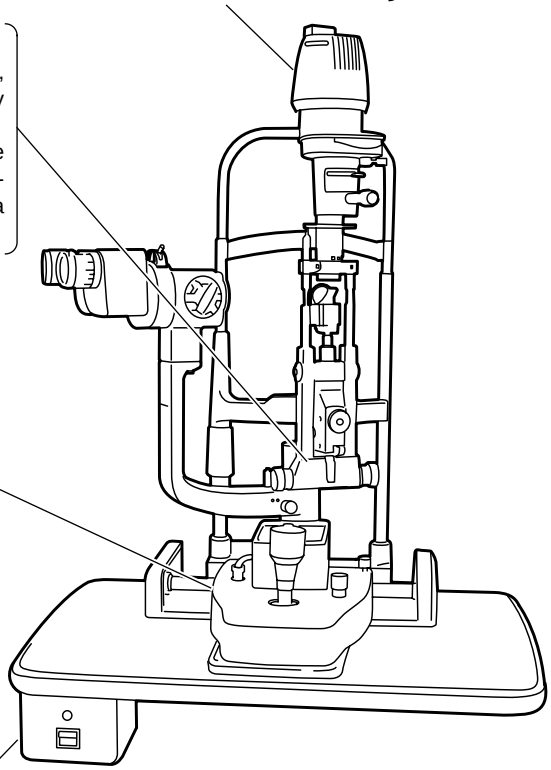
CAUTION

To avoid injury to the patient's head, incline the illumination unit slowly while holding the base unit.
Afin d'éviter toute blessure à la tête du patient, inclinez l'unité d'illumination lentement tout en maintenant la base de l'instrument.

CAUTION

When operating the base unit, please note the following:
Pendant la manipulation de la base de l'instrument, veuillez prendre les précautions suivantes;

- Beware of catching fingers in the moving parts.
  Prenez garde aux pièces mobiles afin d'éviter de coincer les doigts.
- Avoid hitting the patient's eyes or nose.
  Gardez une distance de travail appropriée afin d'éviter le contact avec les yeux et le nez du patient.



CAUTION

- To prevent electric shocks, turn off the power switch and remove the power cable before replacing fuses.
  Afin d'éviter tout choc électrique, coupez le contact et débranchez le câble d'alimentation avant de remplacer les fusibles.
- Use the specified fuse.
  Utilisez des fusibles de même type et de même valeur.

* The illustration depicts the SL-D7 type.

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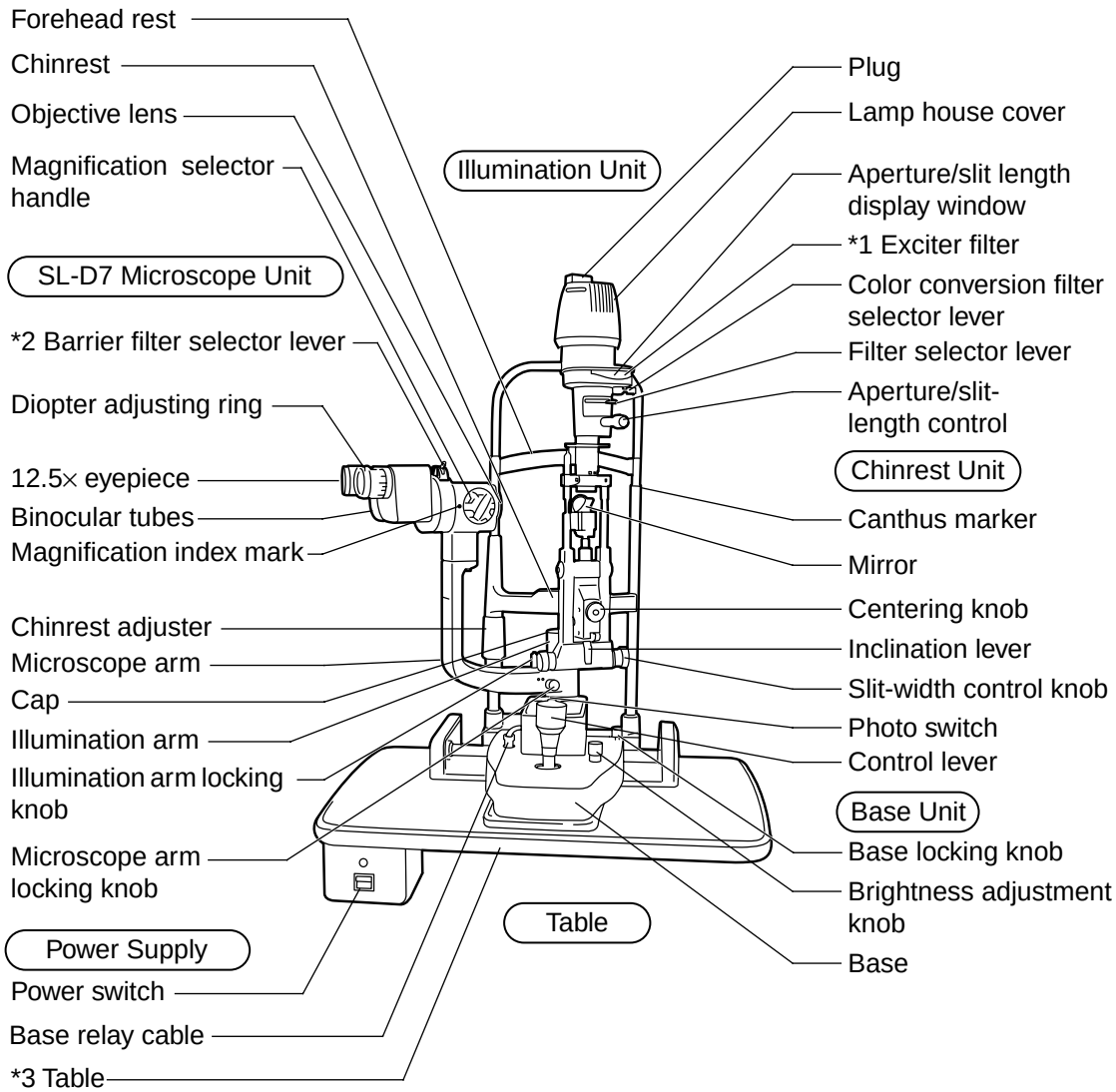
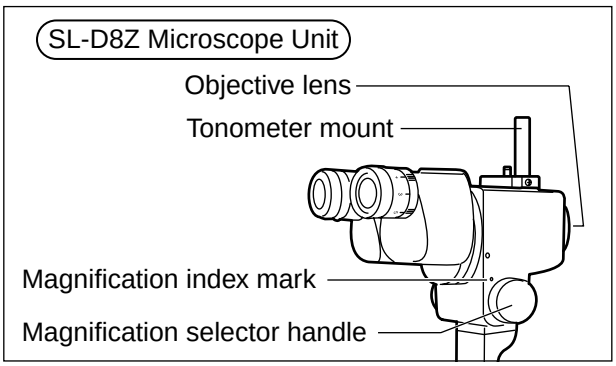
CONFIGURATION

NAMES OF MAIN BODY COMPONENTS



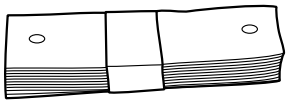
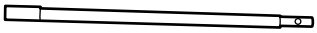
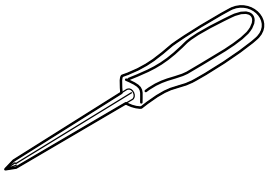
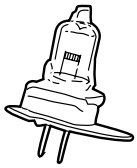
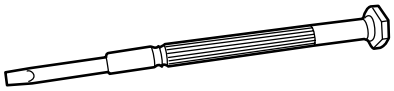
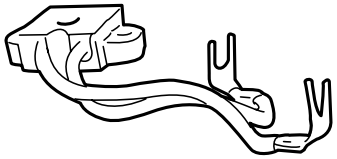
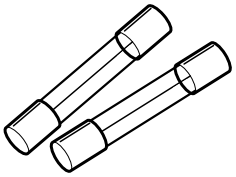
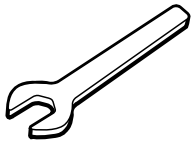
*1,2) A model without exciter filter for slit lamp/barrier filter for slit lamp is also available.

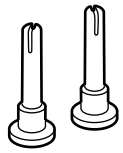
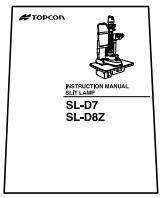
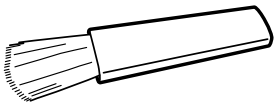
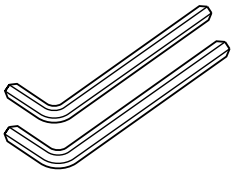
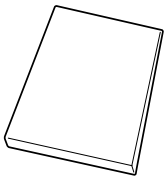
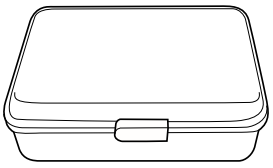
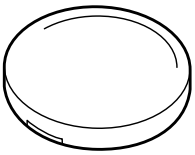
*3) A model without table unit is also available.



STANDARD ACCESSORIES

Make sure that all the following standard accessories are included.
Figures in parentheses are the quantities.

Chinrest tissue (1) 	Dust-cover (1)
Test rod (1) (This is not always included with the standard specifications.) 	Crosshead screwdriver (1) 
Spare illumination lamp (1) 	Screwdriver (1) 
Spare socket (1) 	Spare fuse (2) (Depending on specification, quantity may differ, or this item may not be included in stan-dard accessories.) 
Spare fixation target bulb (1) (for bulb type fixation target only) 	Spanner (1) (for instrument type table top only) 

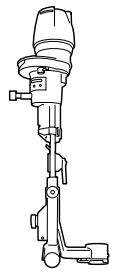
Spare chinrest tissue pin (2) 	Instruction Manual (1) 
Cleaning brush (1) 	Hexagon wrench (2)Attached document (1) 
Square mirror (1) 	Accessory case (1) (This is not always included with the standard specifications.) 
Cap (1) 	

For optional accessories, see “Optional Accessories” on page 49.

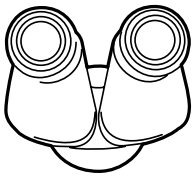
COMPONENTS

COMPONENTS

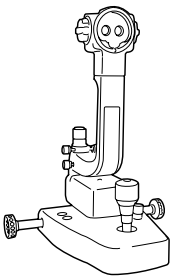
(1) Illumination unit



(2) Binocular tubes

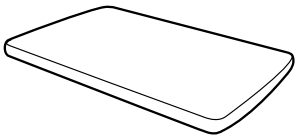


(3) Base unit

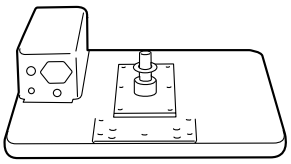


* The photo shows the SL-D7 type.

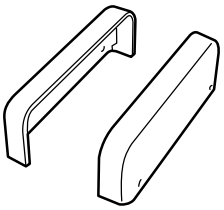
(4) Instrument type table top (w/power supply)



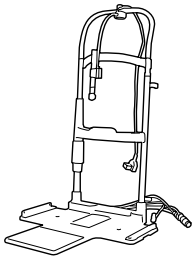
(4)' Unit type table top



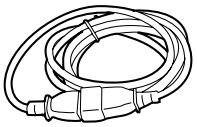
(5) Rail cover



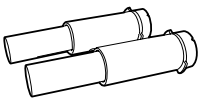
(6) Chinrest unit



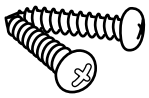
(7) Power cable



(8) Auxiliary spring

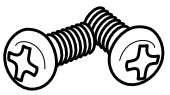


(9) Setscrew

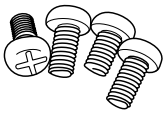


(10) Cable cover

(11) Cable cover fixing screw

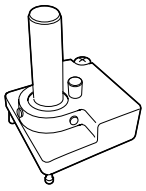


(12) Rail cover fixing screw



(13) Cable clip

(14) Tonometer maunt SO-TM1



Article name	Qty	Article name	Qty
(1) Illumination unit	1	(8) Auxiliary spring	2
(2) Eyepiece unit	1	(9) Setscrew	2
(3) Base unit	1	(10) Cable cover	1
(4) Instrument type table top (w/power supply)*	1	(11) Cable cover fixing screw	2
or (4)' Unit type table top*	1	(12) Rail cover fixing screw	4
(5) Rail cover	2	(13) Cable clip	1
(6) Chinrest unit*	1	(14) Tonometer maunt SO-TM1*	1
(7) Power cable	1		

* (4) or (4)' table top is not included, depending on the specifications.
* (6) Depending on chinrest and (14) Tonometer mount might not be included.

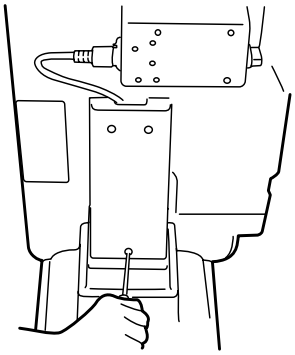
ASSEMBLY PROCEDURE

SECURING THE INSTRUMENT TYPE TABLE TOP

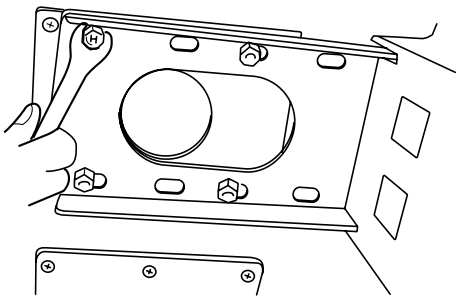
CAUTION	To prevent falling during use and movement, secure each unit.

FITTING TO AUTOMATIC INSTRUMENT TABLE AIT-20/AIT-15

1 Remove the cover of the instrument table. Remove the 3 screws of the cover (AIT-20 only: For details, refer to the instruction manual of AIT-20.)



2 Place the tabletop on the instrument table, and secure it with the 4 bolts attached to the instrument table. To reverse the direction of the instrument table, remove the power supply from the bottom of the table top and secure it on the opposite side.

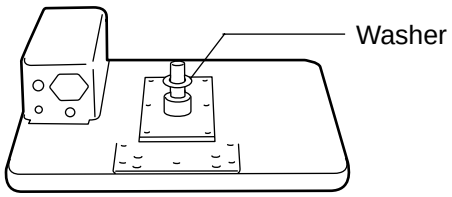


Connect the power cable to the table outlet and power supply of the instrument table. Place the excess cable inside the cover, and attach the cover.

SECURING THE UNIT TYPE TABLE TOP

1 Remove the plastic washer from the unit type table top, which is taped to the shaft assembly.

2 Insert the plastic washer, together with the shaft, into the cavity for the ophthalmic unit arm.

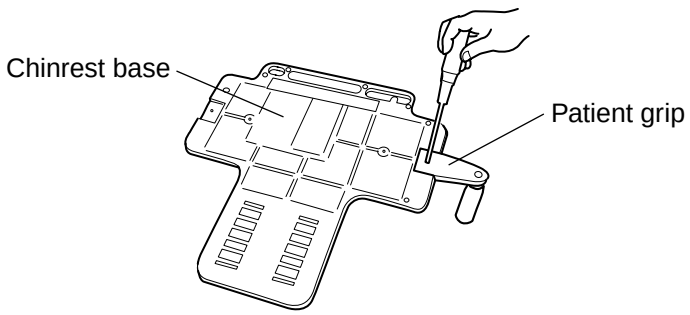


In the unit type table top, the power supply is fitted to attach the ophthalmic unit on the right hand side. When attaching the ophthalmic unit on the left-hand side, remove the power supply and reattach it to the right hand side (with 4 screws).

SECURING THE PATIENT GRIP PG-1(OPTIONAL ACCESSORY)

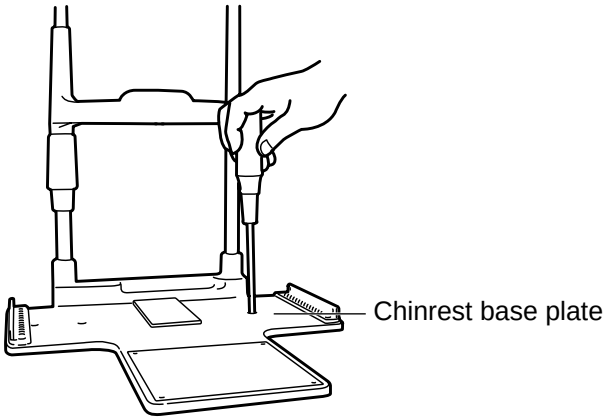
1 Align the patient grip with a groove on the rear of the chinrest base.

2 Fix the patient grip with screws.



SECURING THE CHINREST BASE PLATE

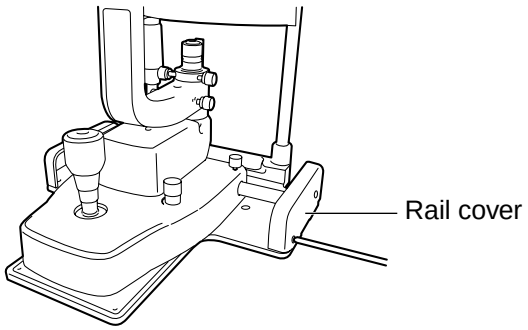
1 Secure the chinrest base plate to the unit type table top with 2 screws (9).



SECURING THE BASE UNIT AND RAIL COVER

1 Align the wheel of the base unit with the rail of the chinrest base plate.

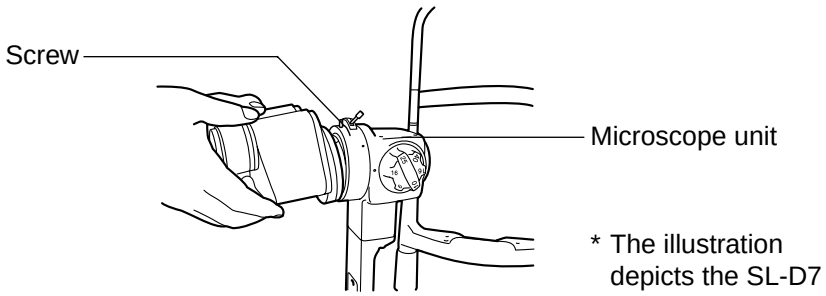
2 Secure the rail covers with 4 screws (12): (2 screws each on the right and left sides).



SECURING THE BINOCULAR TUBES

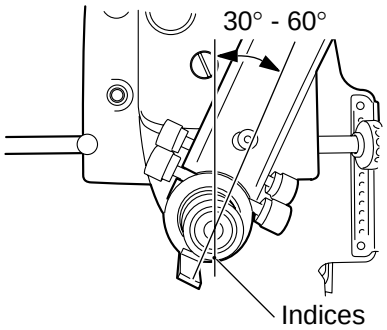
1 Align the pin of the microscope unit with the groove on the binocular tubes, and fit the screw with a hexagon wrench.
In the model without excitor/barrier filter, fit binocular tube with the fixing screw.

Make sure you do not touch the lens surfaces.

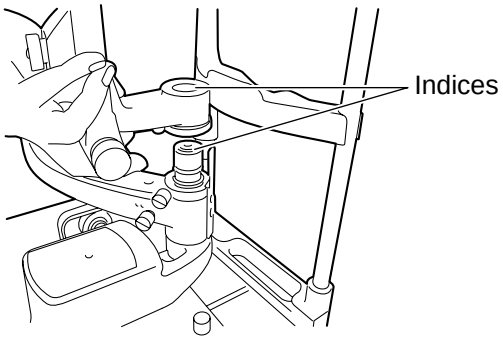


SECURING THE ILLUMINATION UNIT

1 Loosen the microscope arm locking-knob of the base unit, manually turn the shaft and tilt the guide rod-shaft index 30-60°, then refasten the microscope-arm locking-knob.

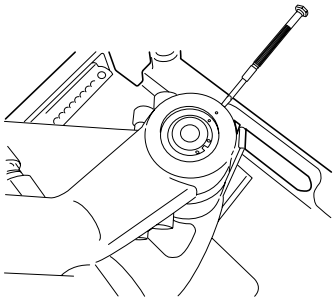


2 Loosen the fixing screw on the outside of the fitting cavity of the illumination unit with a screwdriver. Align indices and slowly lower the illumination unit onto the shaft of the base unit.



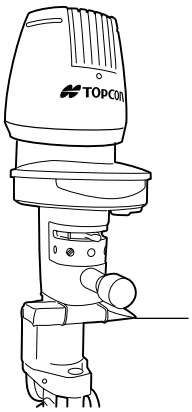
While assembling the illumination unit, take care not to get your fingers caught.

3 Firmly tighten the fixing screw with a screwdriver.



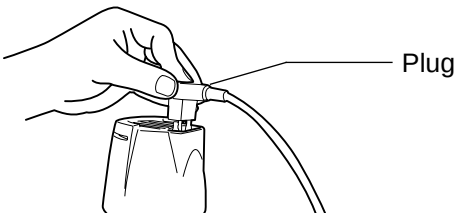
REMOVING THE ILLUMINATION UNIT PAD

1 Remove the rubber band and slowly withdraw the protection pad from the slit operation mechanism of the illumination unit.

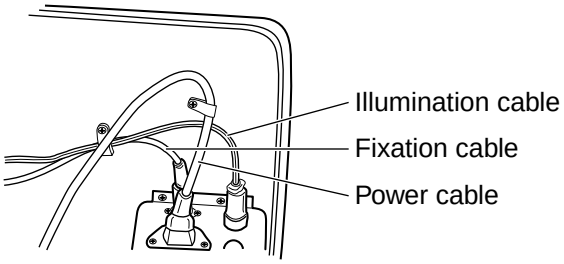


CONNECTING AND SECURING OF CABLES

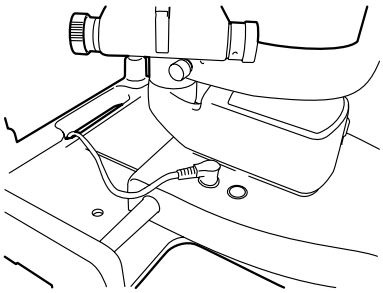
1 Remove the tape from the lamp house cover of the illumination unit. Plug the cable from the upper part of the chinrest into the illumination unit.



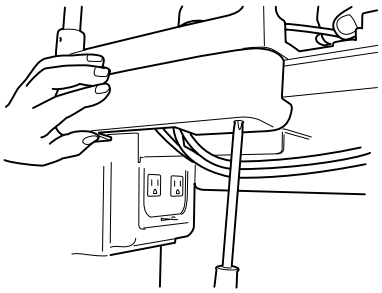
2 Connect the cable from the lower part of the chinrest unit and the power cable to the power supply.



3 Pass the 5 pin connector from the metal plug connected to the power supply through the hole of the chinrest and connect to the base unit.



4 Fit the cable cover with 2 screws (11).



5 Pull the base unit toward the side of the operator, then lock.
Attach the cables to the back of the table with the cable clip (13).

6 Move the base unit and illumination unit, and make sure there is enough cable to allow free movement of the base unit in all directions.

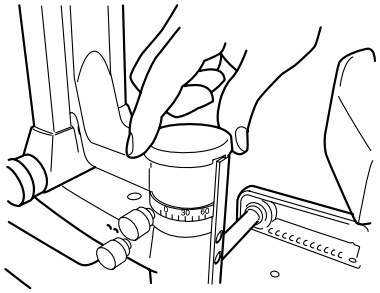
FITTING THE CHINREST TISSUE

1 Remove the chinrest tissue pins.

2 Take approximately one-fifth of the pad of chinrest tissues and secure this at each end with the pins.

FITTING THE CAP

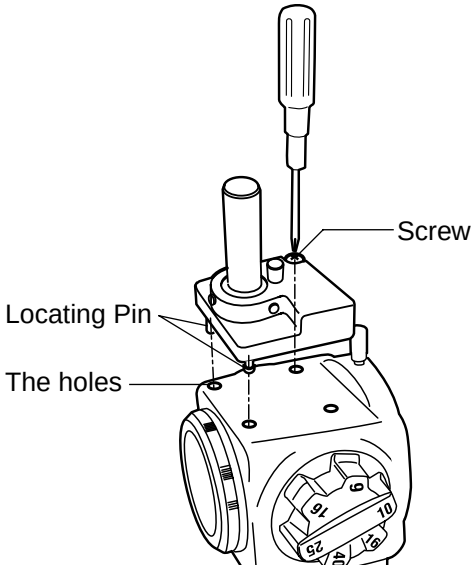
1 Fit the cap to the shaft aligning the guide rod with the groove in the cap.



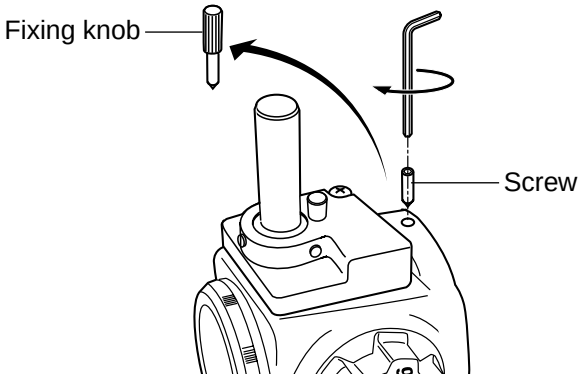
SECURING THE TONOMETER MOUNT SO-TM1 (OPTIONAL ACCESSORY)

Depending on specification, SO-TM1 may be included in standard accessories.

1 Align the locating pin of SO-TM1 into the holes of the microscope, and fasten the screw.



2 Remove the fixing knob of the microscope, and secure the eyepieceunit, etc with the packaged screw.



3 Applanation tonometer R900 type, Photokeratoscope attachment, etc could be mounted on SO-TM1.

COUNTER BALANCING THE VERTICAL MOVEMENT

When accessories, including the photography unit, are fitted to the main body, the vertical counter-balance movement may need to be adjusted. To correct this, auxiliary springs must be fitted.

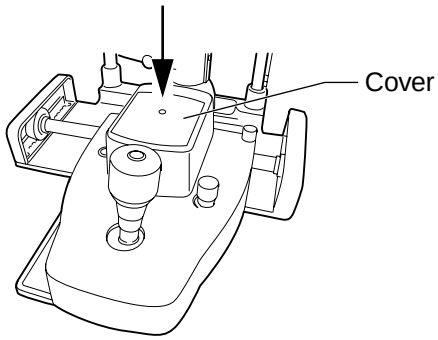
Major Combinations of Accessories and Necessary Auxiliary Springs

<table>
<tr><th rowspan="2">Accessories</th><th colspan="2">Auxiliary Spring type</th></tr>
<tr><th>Tonometer is not fitted</th><th>Tonometer is fitted</th></tr>
<tr><td>TV relay lens TL-55 + SONY DXC-33 (DXC-390)</td><td rowspan="3">——</td><td rowspan="3">Standard auxiliary spring</td></tr>
<tr><td>TV attachment TL-56 +
Nikon Microsystem (Coolpix + Adapter lens)</td></tr>
<tr><td>Digital camera unit DC-1</td></tr>
<tr><td>TV relay lens TL-54 + JVC KY-F70</td><td rowspan="9">Standard auxiliary spring</td><td rowspan="3">Standard auxiliary spring</td></tr>
<tr><td>Electronic flash device FD-21 + Digital camera unit DC-1</td></tr>
<tr><td>Electronic flash device FD-21 (w/TV relay lens TL-55) +
SONY DXC-390</td></tr>
<tr><td>Beam splitter + Observation tube</td><td rowspan="2">Auxiliary spring SO-AS1</td></tr>
<tr><td>Still camera attachment SR-53 + Nikon mount + Fuji S2 Pro</td></tr>
<tr><td>Beam splitter + TV relay lens (1/2C) + JVC KY-F70</td><td rowspan="3">Auxiliary spring SO-AS2</td></tr>
<tr><td>Electronic flash device FD-21 + beam splitter + TV relay lens TL-53 + SONY DXC-390</td></tr>
<tr><td>Electronic flash device FD-21 (w/TV relay lens TL-54) +
JVC KY-F70</td></tr>
<tr><td>Electronic flash device FD-21
(w/still camera attachment SR-53) + Fuji Finepix S2 Pro</td><td rowspan="2">Auxiliary spring SO-AS1</td><td rowspan="2">Auxiliary spring SO-AS3</td></tr>
<tr><td>Electronic flash device FD-21 + beam splitter +
TV relay lens (1/2C) + JVC KY-F70</td></tr>
<tr><td>Electronic flash device FD-21
(w/still camera attachment SR-52) + Nikon D1 (X)</td><td>Auxiliary spring SO-AS2</td><td>Auxiliary spring SO-AS3</td></tr>
</table>

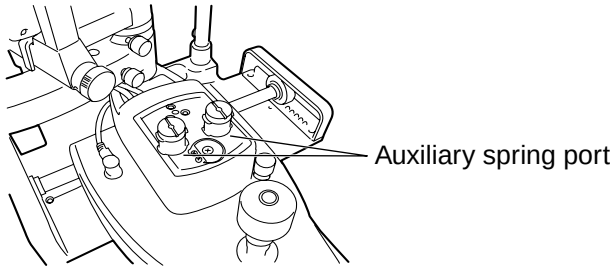
Each auxiliary spring consists of 2 identical springs.
Do not use different springs in a set.

COUNTER-BALANCE PROCEDURE

1 Turn the control lever clockwise and raise the base to the top position, remove the center screw and take off the cover.

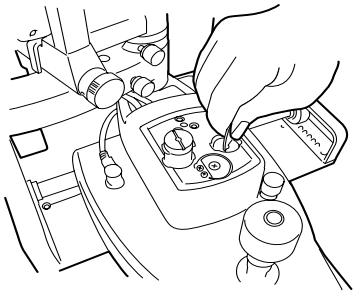


2 Insert the auxiliary spring unit vertically into the auxiliary spring port, with the flange face turned upwards. (Make sure that the spring is inserted into the groove in the bottom of the port.)



3 Open the auxiliary spring unit with the auxiliary spring port, and lightly push the spring till it stops. (A large screwdriver, a flat sheet metal tool, a coin, etc. can be used to this end.)

4 With the auxiliary spring unit lightly touching the stopper, turn about 90° (in either direction), then release. The auxiliary spring locks into the positioning groove and assembly is complete. (To remove the auxiliary spring, lightly press it down to the stopper, rotate it 90° and remove from the port.)



PREPARATIONS

POWERING ON

1 Connect the power cable.

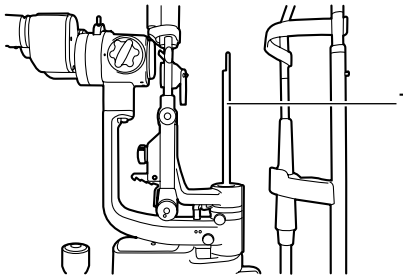
2 Turn ON the POWER switch.

ADJUSTING THE DIOPTER AND PUPILLARY DISTANCE (PD)

NOTICE	To ensure sharp observation of slit images, always carry out the diopter and PD adjustments.

In case that no test rod is provided, set the diopter scale to your diopter by turning the diopter adjustment ring.

1 Insert the test rod into the rotation shaft cavity, and set the black face square with the microscope.



* The illustration depicts the SL-D7

2 Set the eyepiece with scale to the non-dominant eye side.

3 Turn ON the POWER switch, and place the brightness adjustment knob in an intermediate position.

4 Adjust the illumination ϕto 10mm by adjusting the slit adjustment knob and aperture/slit-length selector knob.

5 Turn the diopter adjusting ring of the eyepiece with scale (⊕) fully counter-clockwise.

6 Turn the diopter adjusting ring clockwise and stop when both the scale (⊕) and test rod can be clearly seen.

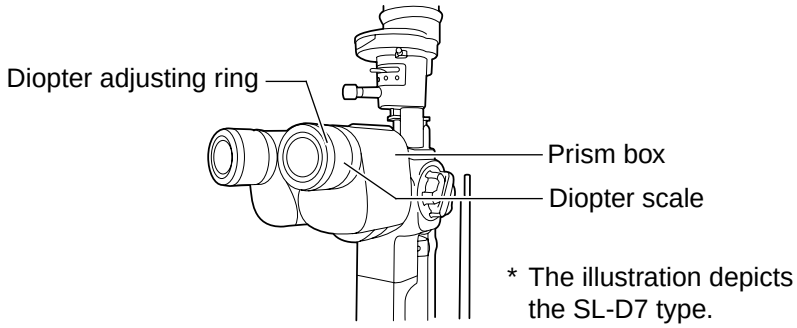
7 Read the value on the diopter scale of the stop position. The value shows the diopter (D).

8 Set the diopter scale of the other eyepiece to the read value.

9 Set the eyepiece with scale (⊕) to the dominant eye side, and adjust the diopter scale of the dominant eye as in steps 5 and 6.

10 After adjusting the diopter, turn the slit adjustment knob until the slit width is about 1mm, then check if the slit image projected on the test rod can be clearly seen with both right and left eyes.

11 Holding the prism box, look through the eyepiece with both eyes, and adjust the pupillary distance so that the image projected on the test rod can be seen without diplopia (double vision), and appears to be three dimensional.



* The illustration depicts the SL-D7 type.

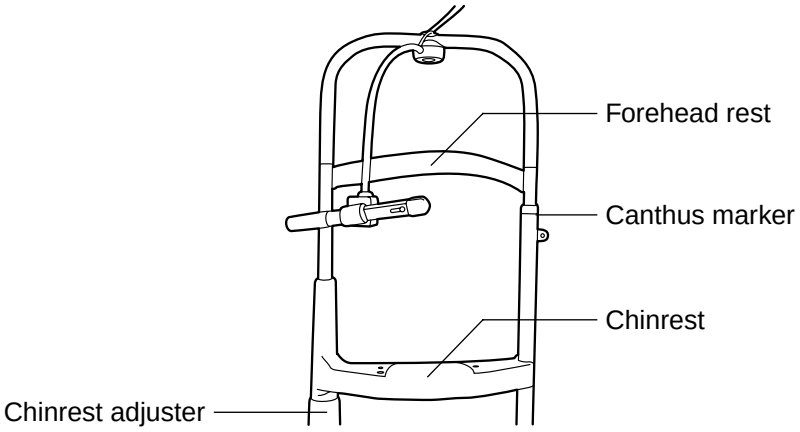
OPERATION PROCEDURE

FIXING THE PATIENT'S FACE AND FIXATION

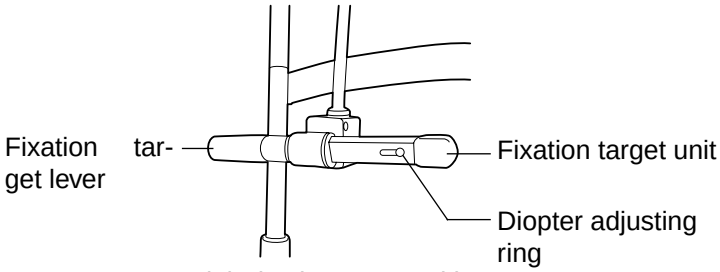
The model without a fixation target is also available.

1 Place the patient's chin on the chinrest with his forehead against the forehead rest.

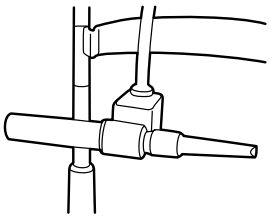
2 By rotating the chinrest adjuster, align the patient's eye with the canthus marker on the chinrest frame.



3 Ask the patient to look at the fixation target with the eye that is not being examined.
To change the patient's fixation point, hold the fixation target at the end opposite to the target and adjust accordingly.



(A) Fixation target with diopter adjustment



(B) Luminous fixation target

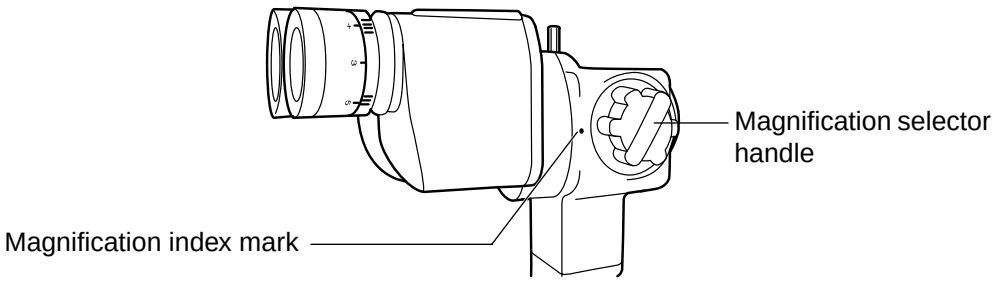
When using the fixation target with diopter adjustment (A), slide the diopter adjustment knob so that the patient can see the following target (◎). The ring target can be adjusted within a range of -15D to +10D.

The luminous fixation target is used for myopia of -15D or more.
When replacing targets, remove the target by pulling gently whilst supporting the opposite end.

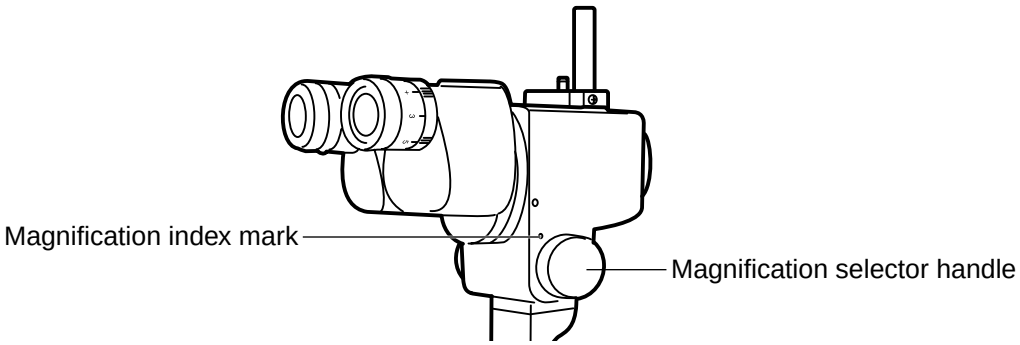
OPERATING THE MICROSCOPE UNIT

Turn the magnification selector to set a magnification value against the magnification index mark.

SL-D7



SL-D8Z



For the overall magnification in conjunction with magnification marks of the magnification selector handle, see page 37.

OPERATING THE BASE AND FOCUSING

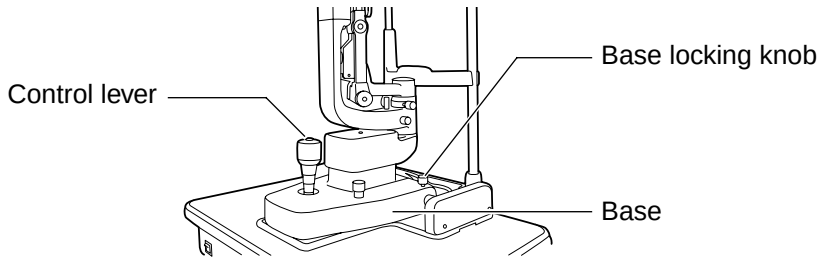
CAUTION	To avoid injury to the eye and nose whilst moving the base unit, make sure that you have a clear view of the slit lamp and the patient's face.
CAUTION	For the safety of the operator and the patient, do not place fingers between moving parts.
NOTICE	To prevent dropping the base locking knob from the base, do not loosen the knob too much.

1 For major horizontal movements, hold the control lever in the upright position and move the entire base.

2 For fine adjustments, move the control lever in the required direction.

3 The base can be raised by turning the control lever clockwise, and lowered by turning the control lever counter-clockwise.

4 To fix the base, fasten the base locking knob.



- Rough focusing is carried out with major movements, following step 1-3.
- Fine focusing is done with the microscope, following steps 2 and 3.

OPERATING THE ILLUMINATION UNIT

CAUTION	To avoid injury to the patient's head, incline the illumination unit holding the base unit.

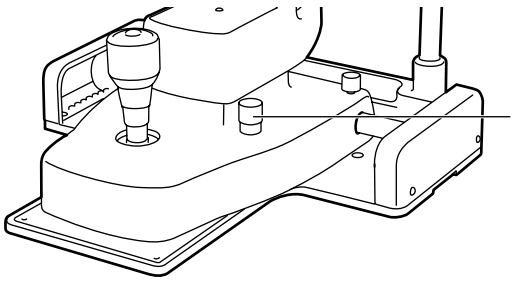
CAUTION	To avoid causing discomfort to the patient or damage to the patient's eye, keep the illumination at its minimum during adjustment.

NOTICE	• Adjust the slit width according to the results of the investigation. • The slit-width scale should be used as a guideline. • When using the square mirror, incline the illumination unit at least 10º. • To protect the patient, use the heat absorption filter, as required.

ADJUSTING THE BRIGHTNESS

Turn the brightness adjustment knob.

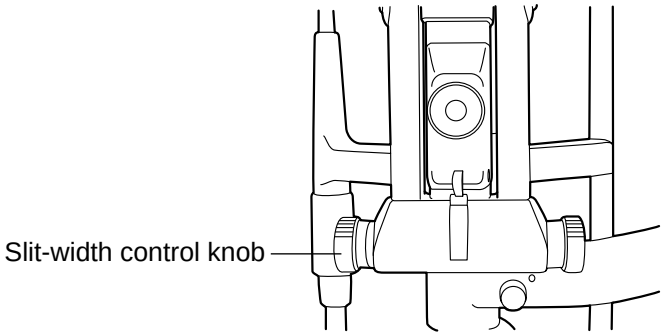
The brightness of the illumination light can be adjusted to the preferred illumination setting.



ADJUSTING THE SLIT WIDTH

Turn the slit-width control knob.

The slit width can be changed gradually between 0 and 14mm (14mm=circle).

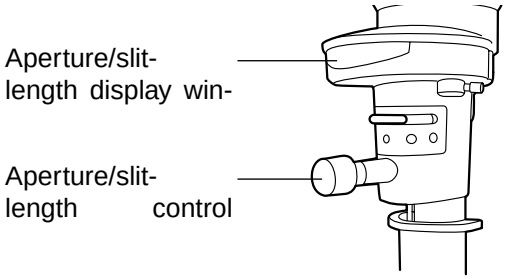


CHANGING THE APERTURE/SLIT LENGTH

Turn the aperture/slit-length control knob.

When the slit is fully opened, 6 types of spot illumination (ϕ14, ϕ10, ϕ5, ϕ2, ϕ1, ϕ0.2) are available. The slit width can be changed gradually from 1mm to 14mm.

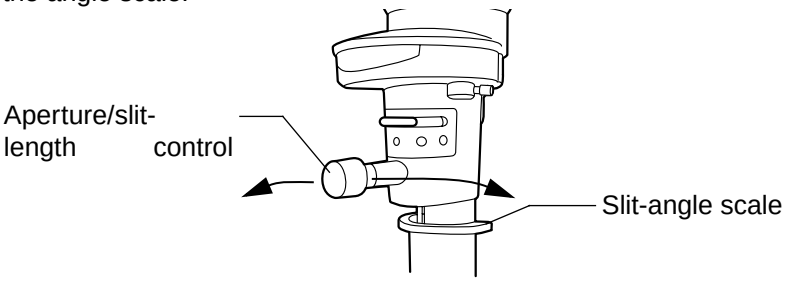
The spot illumination size and slit length are displayed on the aperture/slit-length display window.



TURNING THE SLIT

Horizontally rotate the aperture/slit-length control knob.

This directly changes the slit image from vertical to horizontal. In this mode, the slit angle can be read off the angle scale.



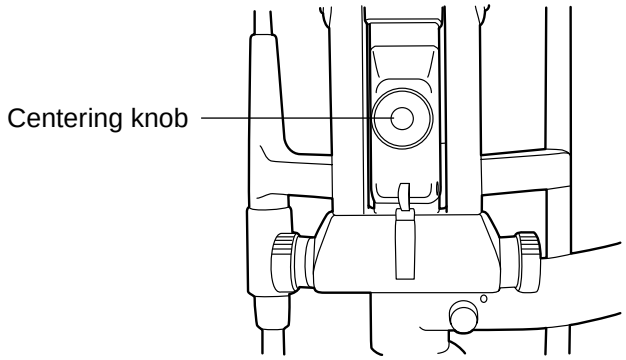
SWINGING THE SLIT SIDEWAYS

Loosen the centering knob and swing the illumination unit right and left.

This provides indirect illumination displacing the slit light from the microscope center.

By fastening the centering knob, the slit light returns to the center of the vision field.

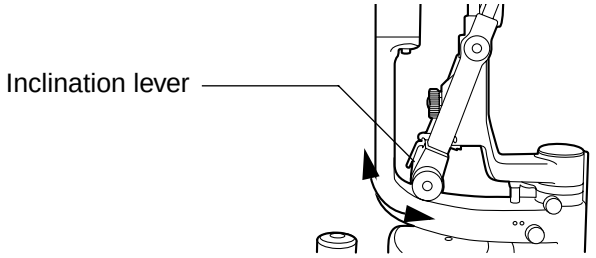
This function is used for scanning observation and observation with indirect illumination.



INCLINED ILLUMINATION

Press to unlock the inclination lever and pull.
The illumination unit is inclined for inclined illumination up to 20° in 5° steps.

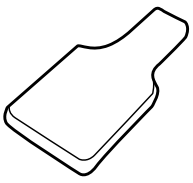
This function is used for observing a horizontal cross section, and for corner angle and fundus observation.



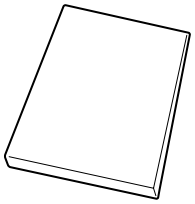
REFLECTION MIRROR

For this instrument, a battledore mirror and a square mirror are available. For normal observation, the battledore mirror is used.
However, if the arm angle scale, which represents the angle formed by the illumination arm and micro-scope arm, reads approx. 3° to 10° and the observation light flux is disturbed by the battledore mirror, then the square mirror should be used.

The square mirror is to be used when the arm angle is opened to more than 10°.



Battledore mirror



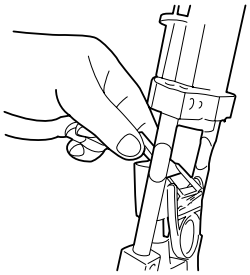
Square mirror

The square mirror is standard accessory.

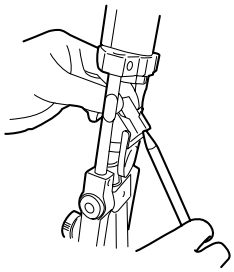
REPLACING REFLECTION MIRRORS

Replace mirrors as follows, taking care not to touch the mirror and lens surfaces:

- Open the microscope arm and illumination arm 30° or more.
- Incline the illumination unit 10° or more.
- Pull out the battledore mirror, holding the slender part on both sides. To reinsert the battledore mirror, hold the slender part on both sides and insert.
- Insert the square mirror from the side recessed on the back.
- To pull out the square mirror, which has no handle, push it up with a pencil, or something similar, as illustrated below.



Battledore mirror

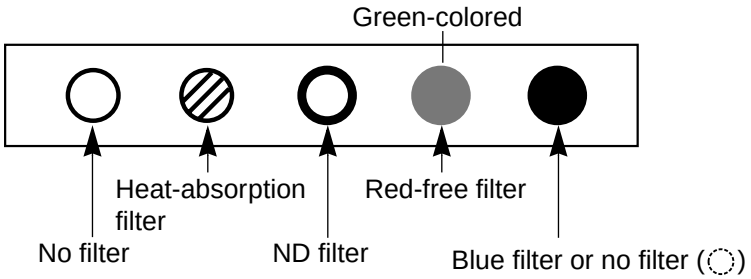


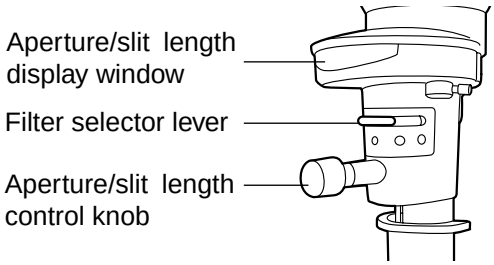
Square mirror

If you touch the mirror or lens surface, please clean this according to the process on page 47 "Cleaning Lenses and Mirrors".

CHANGING FILTERS

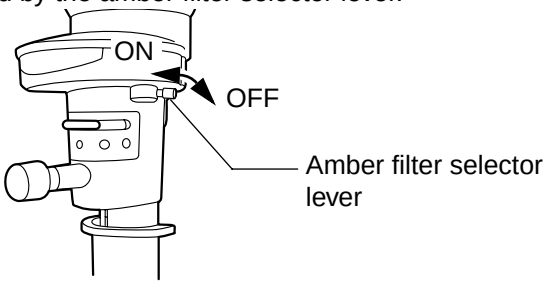
Move the filter selector lever right and left to select the required filter from the 5 types.





AMBER FILTER

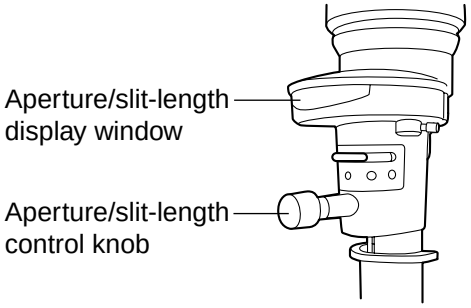
The amber filter is used to facilitate fundus observation.
The filter is inserted or removed by the amber filter selector lever.



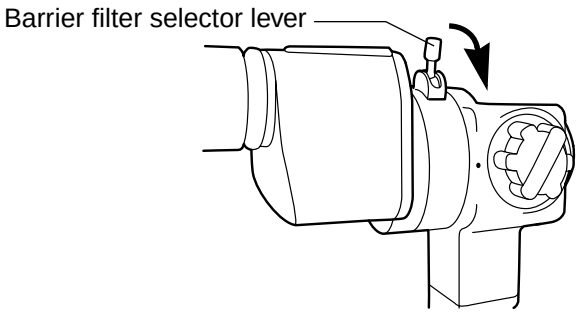
FLUORESCENCE OBSERVATION
(EXCITER FILTER FOR SLIT LAMP/BARRIER FILTER FOR SLIT LAMP)

Fluorescence observation can be carried out using the exciter filter for slit lamp and barrier filter for slit lamp.

1 Turn the aperture/slit-length display window anti-clockwise until the blue circle appears, then insert the exciter filter for slit lamp into the illumination path.



2 Turn the barrier filter selector lever to the right and insert the barrier filter for slit lamp.



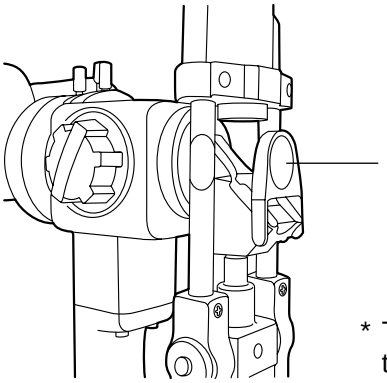
* The illustration depicts the SL-D7 type.

DIFFUSION LENS

When in use, the diffusion lens is set vertically in front of the reflection mirror.
When not in use, remove the lens from the light path.

The diffusion lens is used for observing the entire object with a low magnifica-tion.

NOTICE	When using the diffusion lens, open the microscope arm and illumination arm 30° to avoid friction of the diffusion lens and illumination support. Also, fully open the slit; otherwise this prevents sufficient light from entering.



* The illustration depicts the SL-D7 type.

ENDING PROCEDURE

Turn OFF the Power switch.

TROUBLESHOOTING

TROUBLESHOOTING GUIDE

CAUTION	To avoid electric shocks, do not attempt overhauling, rebuilding or repairs. Ask your dealer for repair.

If you suspect a problem, check the possible cause by means of the check list below.
If the check list below does not solve the problem, or if the problem is not included in the list, contact your dealer or TOPCON (see the back cover).

Check List

Problem	Possible cause	Check	Page
Illumination lamp does not work	Cable connection is disconnected	Check cable connection.	20
	Base relay cable is switched off.	Connect the cable.	20
	Plug of lamp house cover is switched off	Insert plug.	20
	POWER switch is OFF	Turn ON POWER switch.	25
	Brightness adjustment knob is the minimum	Turn up brightness adjustment knob.	30
	Illumination lamp is broken	Replace it with a new illumination lamp.	44
	Socket has deteriorated	Replace it with a new socket.	45
Illumination field is not uniform/is shady/is dark	Filter selector lever is out of position	Click filter selector lever.	33
Fixation target lamp does not work	Fixation cable is off	Insert cable.	20
Fuse blows	Rated capacity of fuse is incorrect	Use fuse with correct rating & authorized fuse.	44, 46
Slit width narrows by itself	Slit-adjustment knob torque has been decreased	Readjust slit-width control knob torque.	42

SPECIFICATIONS AND PERFORMANCE

SPECIFICATIONS AND PERFORMANCE

	SL-D7	SL-D8Z
Microscope unit		
Type	Galileo type	
Magnification	Drum, 5-step magnification	Manual zooming
Magnification steps	6/10/16/25/40	10, 16 and 25 w/clicks
Overall magnification (actual vision field)	6.37 (ϕ35.1mm)/ 9.94 (ϕ22.5mm)/ 15.87 (ϕ14.1mm)/ 25.37 (ϕ8.8mm)/ 39.62 (ϕ5.6mm)/	6.35 - 31.75 (ϕ35.2 - ϕ7mm)
Eyepiece lens	Magnification: 12.5x Diopter adjustment range: -5D - +5D	
Binocular tubes	PD adjustment: 55 - 78mm	
Illumination unit		
Illumination field	Slit width: 0-14mm, can be altered gradually(14mm=circle) Slit length: 14-1mm, can be altered gradually(14mm=circle) Aperture diameter: ϕ14, 10, 5, 2, 1, 0.2	
Slit direction	Vertical to horizontal, can be altered gradually Inclination: 5/10/15/20 Side swing	
Filter	Blue filter, red-free filter, amber filter, UV cut filter (normal use), IR cut filter (normal use), ND filter (13% transmission), heat insulation filter, exciter filter for slit lamp*1, barrier filter for slit lamp*2	
Illumination lamp	12V, 30W halogen lamp	
Chinrest/forehead rest unit		
Forward-backward movement	90mm	
Right-left movement	100mm	
Vertical movement	30mm	
Amount of movement in all directions	15mm	
Amount of vertical movement of chinrest	80mm	
Fixation target*3	Fixation target with diopter adjustment Luminous fixation target	
Fixation lamp	LED (Red) or bulb (white)	

	SL-D7	SL-D8Z
Dimensions, Weight		
Dimensions: w/Table	550mm(W)x399mm(D)x760-790mm(H)	
w/ Unit Table	440mm(W)x399mm(D)x760-790mm(H)	
w/o Table	329mm(W)x349mm(D)x652-682mm(H)	
w/o Table and Chinrest	329mm(W)x306mm(D)x652-682mm(H)	
Weight: w/Table	19kg	19.5kg
w/ Unit Table	18kg	18.5kg
w/o Table	13kg	13.5kg
w/o Table and Chinrest	11.5kg	12kg
Table size	550mm x 370mm	
Unit Table size	440mm x 350mm	
Height from the top to patient's eye	375mm	

*1), *2) A model without exciter filter for slit lamp/barrier filter for slit lamp is also available.
*3) A model without fixation target is also available.

- The specification and design of the product can be altered for improvements without prior notice.

ELECTROMAGNETIC COMPATIBILITY

- This product conforms to the EMC standard (IEC60601-1-2:2001).

ELECTRIC RATING

- Source voltage:100-120V, 220-240V AC, 50/60Hz
- Power input: 160VA

SYSTEM CLASSIFICATION

- Type of protection against electric shocks: Class I equipment
  Class I equipment does not depend on basic insulation only for protection against electric shocks. It can also be earthed; therefore, the metal parts with which one comes into contact do not become conductive if the basic insulation fails.
- Degree of protection against electric shocks: Type B applied part
  Type B applied part is the applied part complying with the specified requirements of the Standard IEC 60601-1 to provide protection against electric shock, particularly regarding allowable LEAKAGE CURRENT.
- Degree of protection against harmful ingress of water: IPx0
  SL-D7/D8Z has no protection against ingress of water. (The degree of protection against harmful ingress of water defined in IEC 60529 is IPx0)
- Classification according to the methods of sterilization or disinfection recommended by the manufacture: not applicable.
  SL-D7/D8Z has no part to be sterilized or be disinfected.
- Methods of sterilization or disinfection recommended by the manufacturer: SL-D7and SL-D8Z do not have any part to be sterilized or disinfected.
- Not AP or APG equipment
- Classification according to the degree of safety of application in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide.
  SL-D7/D8Z should be used in environments where no flammable anesthetics and/or flammable gases are presents.
- Classification according to the mode of operation: Continuous operation.
  Continuos operation is the operation under normal load for an unlimited period, without the specified limits of temperature being exceeded.

PURPOSES OF USE

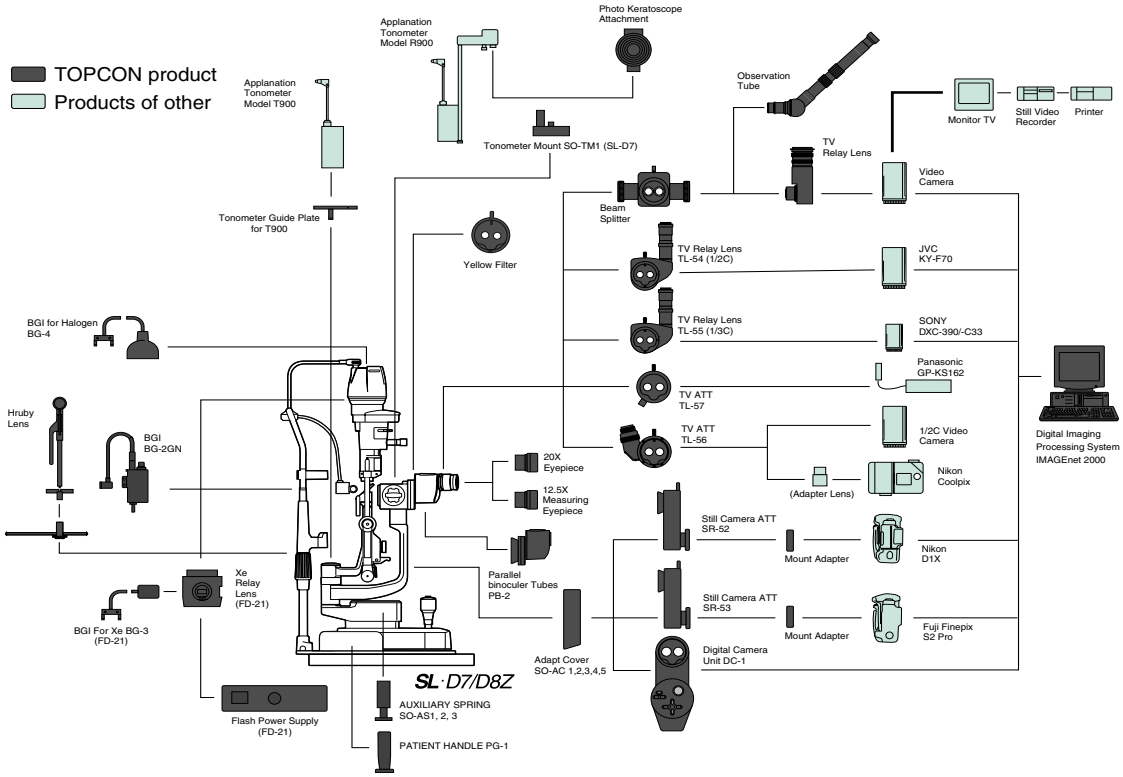
- This instrument is used for the enlargement observation of eyeballs and the parts.

OPERATION PRINCIPLES

- Illuminates the observed part by the illumination light emitted from the illumination optical system and allows enlargement observation by binocular stereoscopic microscope.

SYSTEM CONFIGURATION

SL-D7/D8Z System Chart



SHAPE OF PLUG

Country	Voltage/frequency	Shape of plug
Mexico	110V/50Hz	Type C&E
Argentina	220V/60Hz	Type A
Peru	220V/60Hz	Type A
Venezuela	110V/50Hz	Type C&E
Bolivia & Paraguay	220V/60Hz	Type A (Most common) Type H (Infrequently)
Chile	220V/60Hz	Type A
Colombia	110V/50Hz	Type C
Brazil	220V/60Hz 127V/60Hz	Type A Type C
Ecuador	110V/50Hz	Type C&E

SYMBOL

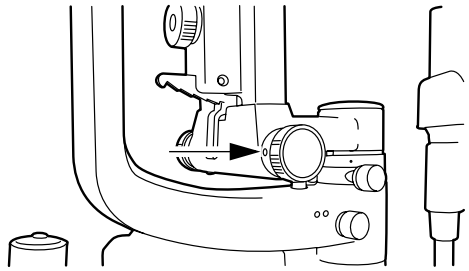
Symbol	IEC Publication	Description	Description (French)
	60417-5032	Alternation Current	Courant alternatif
	60348	Attention, consult accompanying documents	Attention, consulter les documents d'accompagnement
	60417-5008	Off (power: disconnection from the mains)	Éteint (courant: coupure avec le secteur)
	60417-5007	On (power: connection of the mains)	Allumé (courant: raccordement sur le secteur)
	60878-02-02	Type B applied part	Classe B

MAINTENANCE AND CHECKUPS

MAINTAINING THE PRECISION

ADJUSTING THE SLIT WIDTH CONTROL KNOB TORQUE

- If the slit width narrows by itself due to a decrease in slit width control knob torque, adjust the torque as follows.



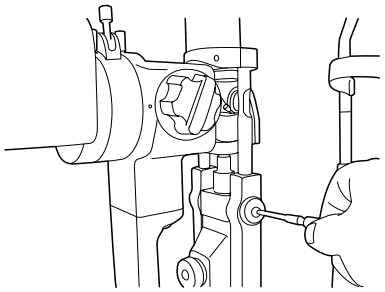
1 Using the attached hexagon wrench, loosen the slit width control knob.

2 Press the slit-width control knob on the left-hand side, and turn the right-hand side clockwise.

3 Fasten the slit width control knob on the right-hand side with the hexagon wrench.

ADJUSTING THE INCLINATION TORQUE

- If the inclination torque of the illumination unit is too low, fasten the arm inclination by tightening the screws clockwise on both sides of the arm.



* The illustration depicts the SL-D7 type.

PERIODIC MAINTENANCE

Before using, confirm the following:

- Adjust the diopter and eye width following “ADJUSTING THE DIOPTER AND PUPILLARY DISTANCE (PD)” on page 25 and turn the slit adjustment knob and make the slit width about 1mm: The slit image projected on the test rod is seen clearly.
- Move the base forward-backward and right-left: The base moves smoothly.
- Component parts, including the eyepiece unit, are fitted in place.
- The chinrest base is firmly fitted to the table.
- Cables and plugs are firmly connected.

DAILY CARE

- This instrument may be affected adversely by dust. Apply the dust cover when not using.

PLACING AN ORDER FOR CONSUMABLES

- When ordering consumable items, contact your dealer or TOPCON (see the back cover). Specify the article name, product code and quantity.

Article name	Product code
Illumination lamp	446802570
Socket	446802590
Chinrest tissue	403104082
Fuse T-1A, 250V (Bel Fuse, Part No.5TT1):100-120V	446356003
Fuse T-0.75A, 250V (Bel Fuse, Part No.5TT750):220-240V	447706351
Fixation target bulb	403504211

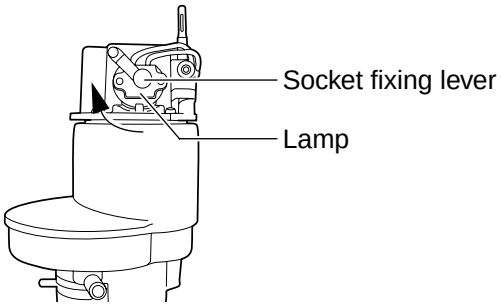
REPLACING ILLUMINATION LAMPS

CAUTION	When replacing the lamp, switch off the power supply and remove the power cable to avoid electric shocks.
CAUTION	Beware of high temperatures when replacing the lamp immediately after switching it off: these could cause burns.
NOTICE	• To ensure perfect illumination, make sure that the socket flange and notch are firmly fitted to the lamp house. • Use a soft cloth and do not touch the illumination lamp with bare fingers: fingerprints and stains may affect illumination and cause premature failure of the lamp.

1 Turn OFF the POWER switch and remove the cable plug.

2 Turn the lamp housing cover clockwise and remove upward.

3 Lightly pull the socket fixing lever and turn in the direction indicated by the arrow.



4 Remove the socket assembly with the lamp.

5 Remove the lamp from the socket.

6 Fit the new lamp in reverse order, making sure the direction of the illumination lamp and socket is correct.

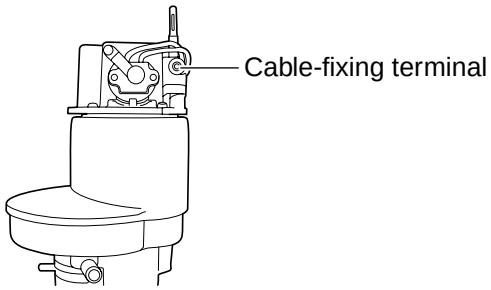
REPLACING SOCKETS

NOTICE	The socket may deteriorate due to the constant heat: therefore, it should be replaced after the lamps have been changed two or three times.

1 Remove the lamp following steps 1-4 of “Replacing Illumination Lamps”.

2 Loosen the cable-fixing terminal, remove the cable, and replace the socket with a new one.

3 Fit the new socket in reverse order.



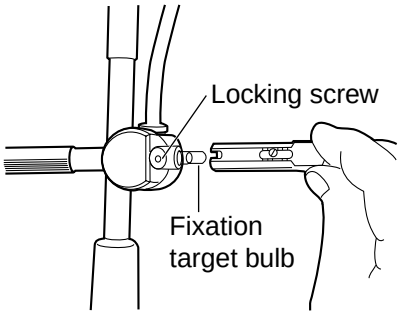
REPLACEING THE FIXATION TARGET BULB

1 Turn OFF the POWER switch.

2 Loosen the locking screw and the remove the fixation target. (Do not over-loosen the locking screw, or it may drop.)

3 Hold the top of bulb and pull it out; then insert the new bulb.

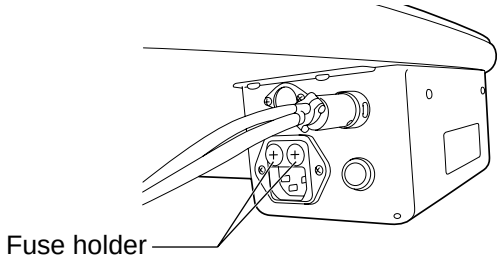
4 Insert the fixation target, then tighten the locking screw.



REPLACING FUSES

CAUTION	When replacing fuses, first switch off the power supply and remove the power cable to avoid electric shocks.
NOTICE	Use the glass tube fuse with the rating as stated on the side of the fuse holder.

1. Switch OFF the POWER switch and remove the power cable from the AC power source.
2. Turn the fuse carrier with a straight-bladed screwdriver. Remove the fuse from its carrier.
3. Replace it with a new fuse of the correct rating.
4. Fit the fuse carrier in reverse order.



RESTOCKING CHINREST TISSUE

When the chinrest tissue supply is depleted, pull out the chinrest tissue pins and replace tissue.

DAILY CARE

CAUTION	Before carrying out daily care, remove the power cable (to avoid electric shocks) and wait until the lamp house has cooled (to avoid burns).
CAUTION	Do not touch parts inside the lamp house cover during operation and immediately after switching off the power supply: this could cause burns.
NOTICE	• To prevent the chinrest, forehead rest and other plastic parts from discoloration and deterioration, do not use volatile solvents for cleaning, including benzine, thinner, ether, gasoline, etc. • Wipe parts with a cloth moistened with a tepid solution of neutral kitchen detergent.

CLEANING APPLIED PARTS

Wipe the forehead rest, the chinrest and the patient grip (if a pair of patient grip is used) with a cloth moistened with a tepid solution of neutral detergent for kitchenware.

CLEANING LENSES AND MIRRORS

REMOVING STAINS

NOTICE	To prevent damaging lens surfaces, do not hold gauze with tweezers.

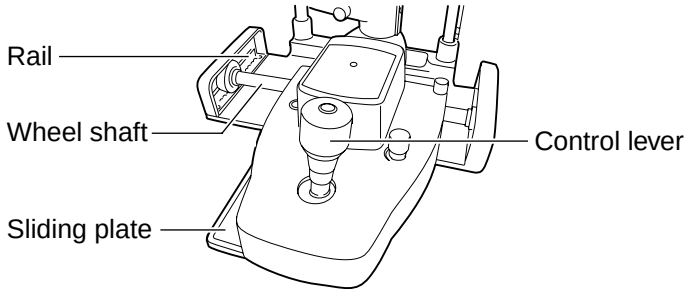
1. Prepare a solution of ethyl alcohol 20% and ether 80%.
2. Remove dust from lens and mirror surfaces with the cleaning brush, or a blower.
3. Using clean gauze or lint-free tissue, lightly clean with a rotating movement from the center of the lens/mirror outwards.
4. If the stain remains, repeat this 2 to 3 times.
5. If stains are persistent, call your dealer or TOPCON (see the back cover).

CLEANING THE SLIDING PLATE, RAIL AND WHEEL SHAFT

NOTICE	When stained, the movement of the sliding plate and rail of the tabletop and the wheel shaft of the base becomes less smooth. Clean them with a dry cloth.

1 Move the base right and left and wipe the wheel shaft clean with a dry cloth.

2 Hold up the control lever and clean the sliding plate with a dry cloth.



DISPOSAL OF THE PRODUCT

CAUTION	The base contains strong springs. Do not attempt to disassemble or burn the base, as the springs could cause injury by shooting out of it.

- For disposal of the instrument and consumables, contact a waste disposer or call your dealer or TOPCON (see the back cover).

OPTIONAL ACCESSORIES

TOPCON Slit Lamp SL-D7 provides the following optional accessories for imaging.
For inquiries, please call your dealer or TOPCON (see the back cover).

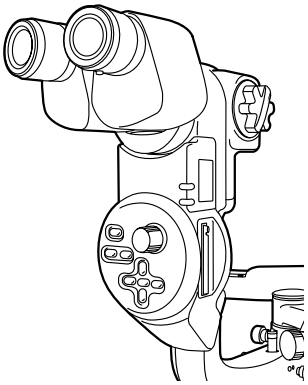
CAUTION	To prevent falling during use and movement, secure optional accessories.

- For details, please refer to the instruction manuals of each product.

DIGITAL CAMERA UNIT DC-1

FEATURES

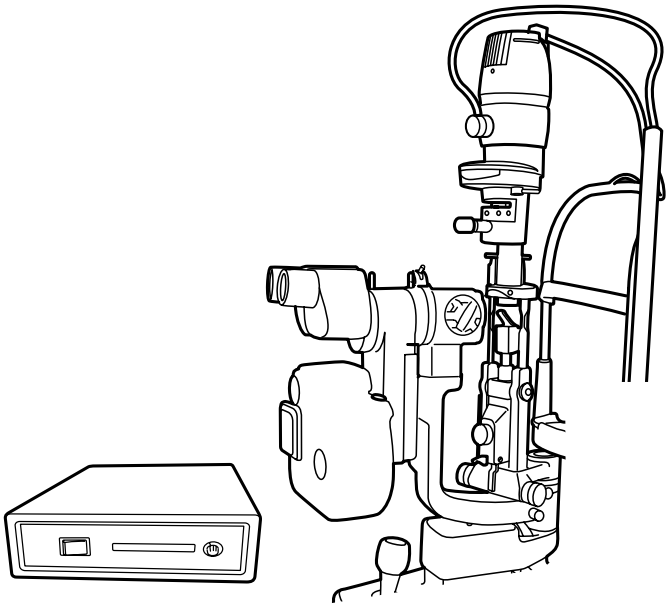
- A digital camera is incorporated with the slit lamp
- As wiring is housed in the arm, cables do not disturb operations.
- Recording with Compact flash card
- Can be connected to the IMAGEnet.



ELECTRONIC FLASH DEVICE FD-21

FEATURE

Can be connected to a marketed camera for flash photography.



CAMERAS TO BE USED

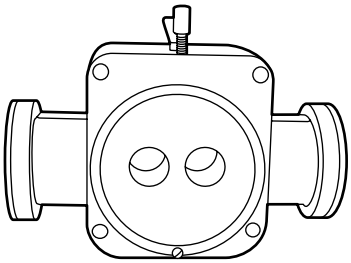
Cameras that can be connected to SL-D7 are shown below. The necessary camera attach--ment and connection cable differ depending on the camera to be used.

Recommended camera	Camera attachment
Nikon D1 series	Camera attachment SR-52
Fuji finepix S-Pro series	Camera attachment SR-53
JVC KY-F70	TV relay lens TL-54
SONY DXC-390	TV relay lens TL-55
TOPCON DC-1	Built-in type photography unit

BEAM SPLITTER

FEATURES

- Used to attach the TV relay lens T-53 (w/ beam splitter type) and observation tube
- The TV relay lens T-53 and observation tube can be attached to either side.
- The beam splitter division ratio is TV 50%: patient 50%.



TV RELAY LENS

- Four types of TV relay lens are prepared for different TV camera types to be used (C mount 2/3 type, C mount 1/2 type, C mount 1/3 type and bayonet mount 1/2 type for Sony).

FEATURES

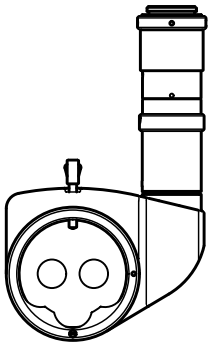
- Used with the beam splitter.
- Can connect a TV camera to carry out monitor observation and photograph still images.

TV RELAY LENS TL-54/55 (BUILT-IN BEAM SPLITTER TYPE)

- The type of TV relay lens differs according to the type of TV camera to be used.
  TV relay lens for 1/2 type TV camera: TL-54
  TV relay lens for 1/3 type TV camera: TL-55

FEATURES

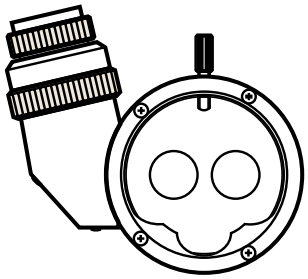
- Incorporated with the beam splitter.
- Can connect a TV camera to carry out monitor observation and photograph still images.
- The beam splitter can be switched IN/OUT.
- The beam splitter division ratio is TV 50%: patient 50%.



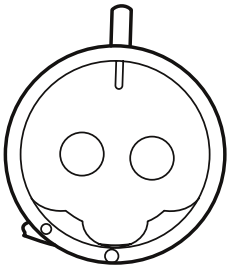
TV ATTACHMENT TL-56

FEATURES

- Used to connect the Nikon Coolpix series digital camera.
- Incorporated with the beam splitter.
- The beam splitter division ratio is TV 50%: patient 50%.



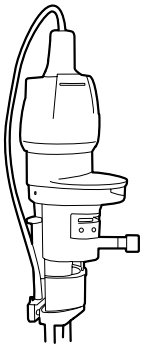
TV ATTACHMENT TL-57



FEATURES

- Used to connect the Panasonic GP-KS162 digital camera.
- Incorporated with the beam splitter.
- The beam splitter division ratio is TV 50%: patient 50%.

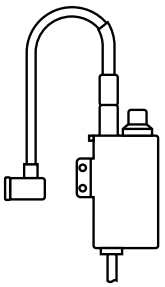
BACKGROUND ILLUMINATION BG-4



FEATURES

- Used for background illumination.
- The light volume differs according to the illumination light volume of the slit lamp.
- Equipped with 3-step illumination function (fully open, half open, closed).

BACKGROUND ILLUMINATION BG-2GN

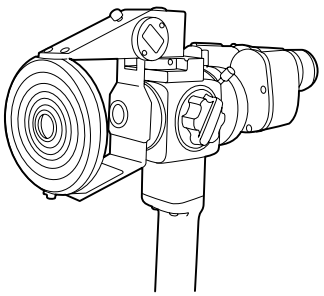


FEATURES

- Used for background illumination with LED light source.
- Power is supplied from the slit lamp power supply.
- Light intensity can be adjusted.

BG-1GN cannot be used with SL-D7, SL-D8Z.

PHOTO KERATOSCOPE ATTACHMENT



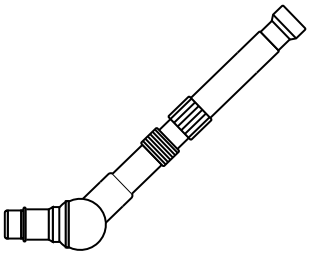
FEATURES

- Can easily record the cornea configuration by camera.

* For attachment to SL-D7, the tonometer mount SO-TM1 is required.

* For photography, FD-21 and a photography unit/TV relay lens are required.

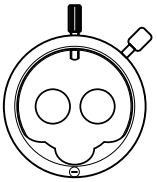
OBSERVATION TUBE



FEATURES

- Used with the beam splitter.
- Used for observation together with the operator.
- Can be inclined to facilitate observation.

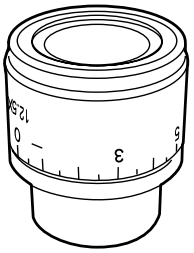
YELLOW FILTER UNIT



FEATURES

- Combines with the blue filter prepared in the main body for a high-contrast fluorescence observation.
- Easy switching between filter insertion & removal.

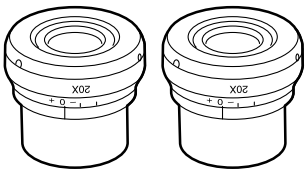
12.5X MEASURING EYEPIECE



FEATURES

- Can measure dimensions and angles (by replacing the normal eyepiece).

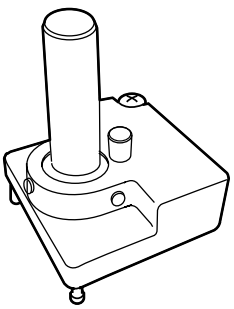
20X EYEPIECE



FEATURES

- Replaces the normal eyepiece for high magnification observation.

APPLANATION TONOMETER



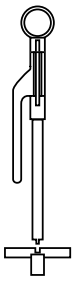
FEATURES

- For the measuring of the intraocular pressure, models R900 type and T900 type, Haag-Streit, are available.

* If the R900 type is being used for the SL-D7, the tonometer mount SO-TM1 is required.
(Depending on specification, SO-TM1 may be included in standard accessories.)

* If the T900 type is in use, the tonometer guide plate (for T-900 type) is required.

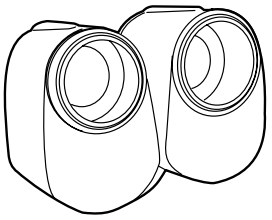
HRUBY LENS



FEATURES

Normally, observation can be carried out only as far as the vitreous body of the anterior segment, due to the refracting power of the cornea and lens. With the Hruby lens, the posterior vitreous body and fundus can also be observed.

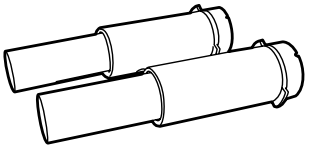
PARALLEL BINOCULAR TUBE PB-2



FEATURES

- Can observe a parallel view of the object.

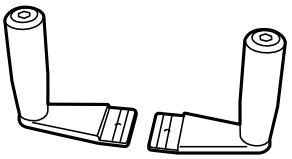
AUXILIARY SPRING SO-AS 1,2,3



FEATURES

- Used to counter-balance vertical movement when attaching accessories, such as a photography unit.

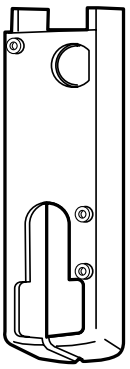
PATIENT HANDLE PG-1



FEATURES

- A grip for patient confort to hold during diagnosis and photographing.
- Can be attached to the chinrest base.

ADAPT COVER SO-AC1, 2, 3, 4, 5



FEATURES

This is used to cover gaps with the microscope arm and hide cables when attaching accessories such as the digital camera unit DC-1 and the still camera attachment SR-52 .

SO-AC1: For SL-D8Z + DC-1/SR-52/SR-53 + barrier filter
SO-AC2: For SL-D7 + DC-1/SR-52/SR-53 + barrier filter
SO-AC3: For SL-D8Z + DC-1/SR-52/SR-53
SO-AC4: For SL-D7 + DC-1/SR-52/SR-53 + yellow filter unit
SO-AC5: For SL-D8Z + DC-1/SR-52/SR-53 + yellow filter unit

When contacting us, please have the following information at hand re your unit:

- Machine type: SL-D7, SL-D8Z
- Manufacturing No. (displayed on the rating plate on the right of the base.)
- Period of Usage (i.e. the purchase date).
- Description of Problem (as detailed as possible).

SLIT LAMP SL-D7, SL-D8Z

INSTRUCTION MANUAL
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SLIT LAMP

SL-D7
SL-D8Z

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